Appendix B: GIS Methodology

Target Ecosystem Characteristic	GIS Layer	Data Source	Process
Coastal Wetlands	Land Use Land Cover (LULC)	2001 National Land Cover Database (NLCD)	Select suiatable classes for restoration
			Reclassify suitable classes
	Existing Estuarine Wetlands	USFWS National Wetland Inventory (NWI)	Select wetland classes from NLCD
			Clip NWI using NLCD wetland classes
			Calculate acreage
	Land Elevation	USGS National Elevation Dataset	Convert floating point to integer
			Reclassify for suitable elevations
	Bathymetry	NOAA Electronic Navigation Charts	Convert bathymetry shapefile to raster
			Reclassify for suitable depths
	Fetch	Calculation	Calculated using UWWAVES tool
			Reclassify for suitable fetch distance
	Coastal Wetland Creation Opportunity	Calculation	Add final LULC, elevation, bathymetry, and fetch raster
			Intersect output layer with Study Region shapefile
			Calculate acreage for each Study Region
Islands for Waterbirds	Islands for Waterbirds	NOAA Shoreline	Select polygons greater than 0.25 acres and less than 200 acres
			Clip all selected polygons using the NWI existing wetland layer
			Calculate the distance to the nearest wetland polygon using the Near tool
			Identify islands surveyed for waterbirds
			Attribute the island shapefile with the number of nesting wading birds
			Intersect final layer with Study Region shapefile
			Calculate island acreage for each Study Region
Coastal and Maritime Forests	Shoreline Buffer	NOAA Shoreline	Create a 1,000 yard inland buffer
	Land Use Land Cover (LULC)	2001 National Land Cover Database (NLCD)	Clip the land use file to the 100 yard buffer
			Select suiatable classes for restoration
			Reclassify suitable classes
	Fetch	Calculation	Calculate fetch distance for the 1,000 yard buffer using the UWWAVES tool
			Reclassify fetch raster for suitable values
			Reclassify unsuitable values to NoData
	Salinity	SWEM/JEM	Convert model grid shapefile to raster
			Reclassify raster for suitable salinity
			Reclassify unsuitable values to NoData
			Buffer the suitable salinity areas to extend to the inland edge of the 1,000 yard buffer
	Maritime Forest Restoration Opportuniy	Calculation	Add final LULC, fetch, and salinity raster
			Intersect output layer with Study Region shapefile
			Calculate acreage for each Study Region

Appendix B: GIS Methodology

Target Ecosystem Characteristic	GIS Layer	Data Source	Process
Oyster Reefs	Bathymetry	NOAA Electronic Navigation Charts	Convert bathymetry shapefile to raster
			Convert floating point to integer
			Reclassify raster for suitable depths
			Reclassify unsuitable values to NoData
	Salinity	SWEM/JEM	Convert model grid shapefile to raster
			Reclassify raster for suitable salinity
			Reclassify unsuitable values to NoData
	Dissolved Oxygen	SWEM/JEM	Convert model grid shapefile to raster
			Reclassify raster for suitable value
	TSS	ST-SWEM	Convert model grid shapefile to raster
			Reclassify raster for suitable value
	Oyster Restoration Opportunity	Calculation	Add final bathymetry, salinity, dissolved oygen, and TSS raster
			Convert calculated raster to shapefile
			Calculate acreage for each feature
			Intersect output layer with Study Region shapefile
			Dissolve layer based on number of criteria met and study region
Eelgrass Beds	Bathymetry	NOAA Electronic Navigation Charts	Convert bathymetry shapefile to raster
			Convert floating point to integer
			Reclassify raster for suitable depths
			Reclassify unsuitable values to NoData
	Salinity	SWEM/JEM	Convert model grid shapefile to raster
			Reclassify raster for suitable salinity
			Reclassify unsuitable values to NoData
	Fetch	Calculation	Calculate fetch distance using UWWAVES tool
			Reclassify fetch raster for suitable values
			Reclassify unsuitable values to NoData
	Chlorophyll a	SWEM/JEM	Convert model grid shapefile to raster
			Reclassify raster for suitable value
	Dissolved inorganic nitrogen (DIN)	SWEM/JEM	Convert model grid shapefile to raster
			Reclassify raster for suitable value
	Dissolved inorganic phosphorus (DIP)	SWEM/JEM	Convert model grid shapefile to raster
			Reclassify raster for suitable value
	Light Penetration	SWEM/JEM	Convert model grid shapefile to raster
			Reclassify raster for suitable value
	Total suspended solids (TSS)	ST-SWEM	Convert model grid shapefile to raster
			Reclassify raster for suitable value
	Eelgrass Restoration Opportunity	Calculation	Add final bathymetry, salinity, fetch, chlorophyl a, DIN, DIP, Light Penetration, and TSS raster
			Convert calculated raster to shapefile
			Calculate acreage for each feature
			Intersect output layer with Study Region shapefile
			Dissolve layer based on number of criteria met and study region

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Target Ecosystem Characteristic	GIS Layer	Data Source	Process
Shorelines and Shallows	Shallow Littoral Zone	NOAA Electronic Navigation Charts	Select suitable depths from bathymetry layer
	Intertidal Zone	NOAA Electronic Navigation Charts	Select negative depth values from bathymetry layer
	Land Use Land Cover	2001 National Land Cover Database (NLCD)	Select suiatable classes for restoration
			Reclassify suitable classes
	Coastal Wetland	USFWS National Wetland Inventory (NWI)	See Coastal Wetlands: Existing Estuarine Wetlands
	Man-made Shoreline	National Geodetic Survey Shoreline	Clip file to the study region
			Select man-made shoreline features
Tributary Connections	National Inventory of Dams (NID)	USACE	Acquire and merge NY & NJ state USACE NID datasets
			Clip file to the HRE project area
			Spatially adjust dam points and snap to NHD network
			Delete points that represent dams that are not hydrologically connected - not relevant to this study
	National Hydrographic Dataset (NHD)	USGS	Acquire NHD datasets for both NY & NJ and merge
			Identify the stream reaches between the dams using the Utility Network Analyst.
			Export the identified stream reaches and calculate the distance between dams.
			Append data to a single feature dataset
	Tributary Connections	Created	Intersect output NHD layer with Study Region shapefile
			Calculate stream distance for each Study Region
Enclosed and Confined Waters	Surface Water Classification	NYSDEC/NJDEP	Acquire NY and NJ datasets and clip to the study region
			Merge the NY and NJ datasets
			Identify best use class for all waterbodies
	Combined Sewer Outfall	NYCDEP	Clip file to the study area
	NY 303d List	NYSDEC	Clip file to the study region
			Select waterbodies not attaining best use
	NJ 303d List	NJDEP	Clip file to the study region
			Select waterbodies not attaining best use
	Suspected Hypoxic/Anoxic Areas	Created	Identify and digitize existing hypoxic/anoxic areas
	Bathymetric Depressions	NOAA	Clip file to the study area
Sediment Contamination	Sediment layers	CARP	Calculate concentration percentile rank for each model grid cell
			Import information into model grid shapefile
			Calculate percentile values for ERM/ERL and display on map
			Intersect shapefile with Study Regions
			Calculate acreage above ERM/ERL

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Target Ecosystem Characteristic	GIS Layer	Data Source	Process
Public Access	Public Access Points	Metropolitan Waterfront Alliance (2007)	Clip shapefile to HRE study region
			Buffer points with suitable walking distance
			Attribute the access points with the appropriate study region
Regional maps	Comprehensive Restoration Plan Sites	Harbor Estuary Program and U.S. Army Corps of Engineers (2007)	Clip shapefile to HRE study region

Acronyms:

CARP (Contamination Assessment and Reduction Program)
DIN (Dissolved inorganic nitrogen)
DIP (Dissolved inorganic phosphorus)
ERL (Effects Range Low)
ERM (Effects Range Medium)
HRE (Hudson Raritan Estuary)
JEM (Jamaica Bay Eutrophication Model)
LULC (Land Use Land Cover)
NHD (National Hydrographic Dataset)
NID (National Inventory of Dams)
NJDEP (New Jersey Department of Environmental Protection)
NLCD (National Land Cover Database)
NOAA (National Oceanic and Atmospheric Administration)
NWI (National Wetlands Inventory)
NYCDEP (New York City Department of Environmental Protection)
NYSDEC (New York State Department of Environmental Conservation)
ST (Sediment transport)
SWEM (System-Wide Eutrophication Model)
TSS (Total suspended solids)
USACE (U.S. Army Corps of Engineers)
USFWS (U.S. Fish and Wildlife Service)
USGS (U.S. Geological Survey)
UWWAVES (A GIS toolbox designed to calculate fetch length, wave height and wave period)